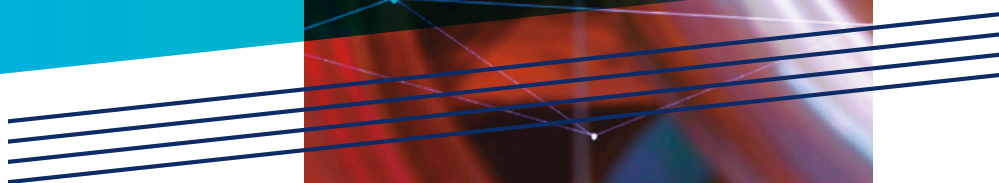
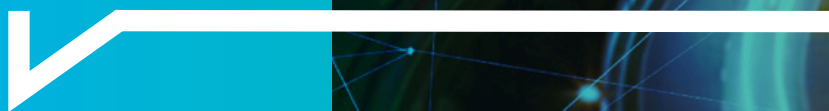




FIWARE FOR SMART CITIES AND TERRITORIES: A DIGITAL TRANSFORMATION JOURNEY



The journey toward smart cities is defined by co-creation – cities, citizens, businesses, and tech providers working together to create solutions for everyone. At its core, FIWARE embodies openness and collaboration. By adopting FIWARE's standards, cities don't just use new technologies; they join a global movement to connect, innovate, and grow.

Smart cities arise from a need to solve complex issues – from urbanization to sustainability – through technology. But making a city “smart” goes beyond sensors; it involves making a city an ICT enabler that drives innovation, growth, and well-being. **Smart City + AI = Intelligent City** – where AI acts as the brain, city, and body, harmonizing with its changing needs.

FIWARE's openness supports this vision by enabling cities to share data and services. As cities interconnect, smart city platforms become data spaces – ecosystems for seamless data exchange. These data spaces will become essential, helping cities pool resources, share best practices, and co-create adaptable solutions. This openness allows cities to avoid isolated systems and gain from shared progress.

The Role of Standards and Ecosystems

Using standard APIs and information models, cities can undergo digital transformation with less effort and cost, achieving maximum impact. This enables interoperable, adaptable, and scalable smart city platforms, securing investments in digital infrastructure.

Collaborating with other cities through data spaces and building vital ecosystems allows cities to connect, co-create, and co-invest. This cooperation fosters a sustainable digital market with solutions tailored to local needs, enhancing agility and innovation and delivering meaningful benefits to citizens.

Cities embracing this collaborative mindset reach digital goals faster, maximize investments, and see higher citizen satisfaction. FIWARE's open-source tools help them build scalable, intelligent solutions.



A Vision for Intelligent Cities

As we look to the future, smart cities must become intelligent cities. This evolution involves using AI and data analytics for proactive governance and growth. FIWARE empowers cities to become innovation hubs where smart city platforms link into a vast data space network, driving inter-city collaborations and addressing global challenges like climate change and urban mobility. The FIWARE ecosystem is critical to this transformation, offering a flexible platform that helps cities achieve their vision of an intelligent, connected, and sustainable future. By embracing openness, co-creation, and data-sharing, we can ensure that smart cities are not isolated but thriving entities evolving for the greater good.

Open Standards allow for **cross-domain and cross-border interoperability and replicability of solutions**. Providers of these solutions can develop once and deploy in multiple cities when they adopt de-facto standards. This way, open standards contribute to the development of a market with appealing incentives, from financial to social benefits, helping a truly innovative ecosystem to emerge.

Open Source is a powerful weapon for driving the **definition of standards following a “driven-by-implementation” and agile approach**. Thanks to Open Source-based technology smaller companies can build business cases for customers who find it challenging to buy a product/service from a large corporation. Large players, on the other hand, can secure their position by working at the edge of innovation. From a business perspective, Open Source is relevant due to its power of commoditizing elements in the technology stack, ultimately impacting positively those companies whose core business is not selling general-purpose platform software but adjacent components / products / services.

Cities and system integrators alike benefit from FIWARE's growing Community and Ecosystem bringing together specialists and organizations continuously building on the FIWARE success story:

400+ Smart Cities References from 35 countries	200+ FIWARE Showcase Solutions	650+ Members fom 69 Countries
9,000+ FIWARE Users	100+ Advocates & Experts	44 FIWARE iHubs
2 Federated Lab Nodes	50+ Impact Stories	40+ Open Source Projects

>>> Context Data in the Digital Realm

Today, every city in the world, no matter their particular constraints (e.g. finance, complexity, space), can take intelligent, practical steps toward making their city more livable, workable, sustainable, and simply smarter. **Data is at the center of the new digital life and linked to our daily activities in cities.** Information coming from many different sources is generated every second, including end users' personal devices, sensors and surveillance cameras deployed across the city, information systems, social networks or third-party applications. **When properly managed, this large amount of data can feed into a Digital Twin representation of the city** that describes what is or may be happening in the city.

Digital Twins have become an essential tool for creating Smart Cities. As a virtual representation of a physical entity (e.g. a street, a building, a car) or a logical entity (e.g. a helpdesk ticket issued by a city, a weather alert generated) in the real world, it reflects the behavior or state of the entity it represents - like a mirror. The concept is still very recent in the Smart Cities domain, but it is predicted to become mainstream within the next five to ten years.

Any software architecture “powered by FIWARE”, corresponding to a smart city vertical solution or the overall smart city platform, **is built around a Digital Twin data representation of the real world.** This representation is built upon **entities**, the so-called Digital Twins, characterized by attributes whose values are gathered from many different sources and are constantly maintained and accessible in right-time. These **attributes are not only limited to observable (measurable) data, but also inferred (augmented insights and knowledge acquired over time thanks to AI/ML data processing) data.** FIWARE can bring into context all such data, ranging from **static** (e.g. the “license plate” of a bus), to **dynamic** (e.g. the “speed” or “number of passengers” in a bus, the “current traffic” and “predicted traffic in 30 minutes” of a street) and even periodically shifting ones (e.g. the “driver” in a Bus which may change twice a day). Important as it is to monitor current values of attributes, it is also vital to analyze them together with historical values, since this provides the means for forecasting forthcoming states or conditions.

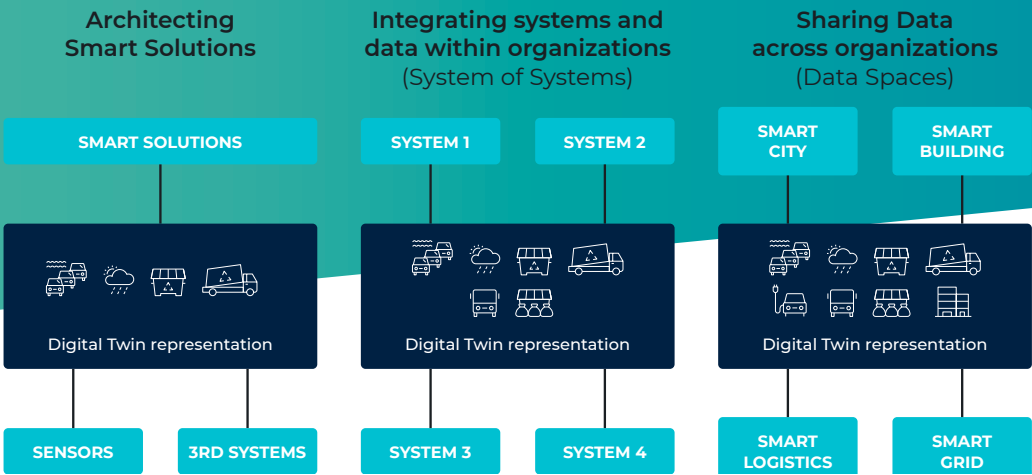
Digital Twins contribute to **safer and more resilient cities**, helping city managers to identify and gather information describing the real world (past and present) which can be processed to **improve planning and effectiveness** in the management of Smart City operations.

Integration at Multiple Levels with FIWARE Digital Twins

Smart City solution providers face the challenge of developing efficient vertical solutions targeted to solve specific challenges, integrating the different verticals within a city to materialize an overall Smart City strategy and bring cities as main drivers of a Data Economy where new data value chains are enabled by the city in partnership with other actors.

A Digital Twin approach provides the basis for data integration at different levels:

- › Within a vertical smart solution, solving how main building blocks within the architecture can be integrated;
- › Within a smart organization, breaking the information silos by bringing support to the integration of different systems within the organization following a system of systems approach;
- › Within a smart data space, establishing the basic common language that systems linked to the different organizations speak and understand.



Innovations around effective data integration, full interoperability, portability of solutions across platforms, can only be achieved through standardization, and **FIWARE brings two essential standards for Digital Twins:**

- 1) An **API**, used for the management of Digital Twin data,
- 2) **Data Models**, to describe the attributes and semantics associated with the different types of Digital Twins.

1) The **NGSI-LD API** provides a simple yet powerful RESTful API using JSON-LD for getting access to context / Digital Twin data. NGSI-LD API specifications have evolved over time driven by feedback from developers and implementation of best practices.

- ✓ **Simple:** easy to learn and to use by any web developer
- ✓ **Powerful:** supporting subscription/notification, geo queries, federation, pagination and Linked Data
- ✓ **Open:** public and royalty-free specifications
- ✓ **Standard:** first published by ETSI in 2018 continues to evolve successfully
- ✓ **Wealth of Open Source implementations:** available in the FIWARE Catalog, accelerating the go-to-market
- ✓ **Globally adopted:** proven track-record, best-in-class solutions, network effect
- ✓ **Domain-agnostic:** not tied to smart cities but other domains (logistics, ports, health, ...) paving the way for the integration of cities into data spaces

2) The **Smart Data Models Program** is a global and collaborative program driving the adoption of data models for Digital Twin types as 'de facto' standards across a wide range of domains. Four recognized global organizations (FIWARE, IUDX, OASC, TM Forum) have been unifying open data and Open Source communities to further boost the creation and adoption of Smart Data Models worldwide.

Tangible benefits come from the mapping of these data models into concrete JSON-LD structures that can be used together with NGSI-LD, thus becoming a crucial asset for developers looking for means to guarantee interoperability between different smart solutions.

- ✓ **Agile:** standardization at market speed (in days/weeks) leveraging existing standards when they exist
- ✓ **Driven-by-implementation:** based on real use case experiences as opposed to designed by a committee
- ✓ **Constantly growing:** **Almost 1000** Smart Data Models after its first operational year (projected to grow by 20% of new models/year)
- ✓ **Open and global:** anyone can join this market oriented program and/or contribute on GitHub



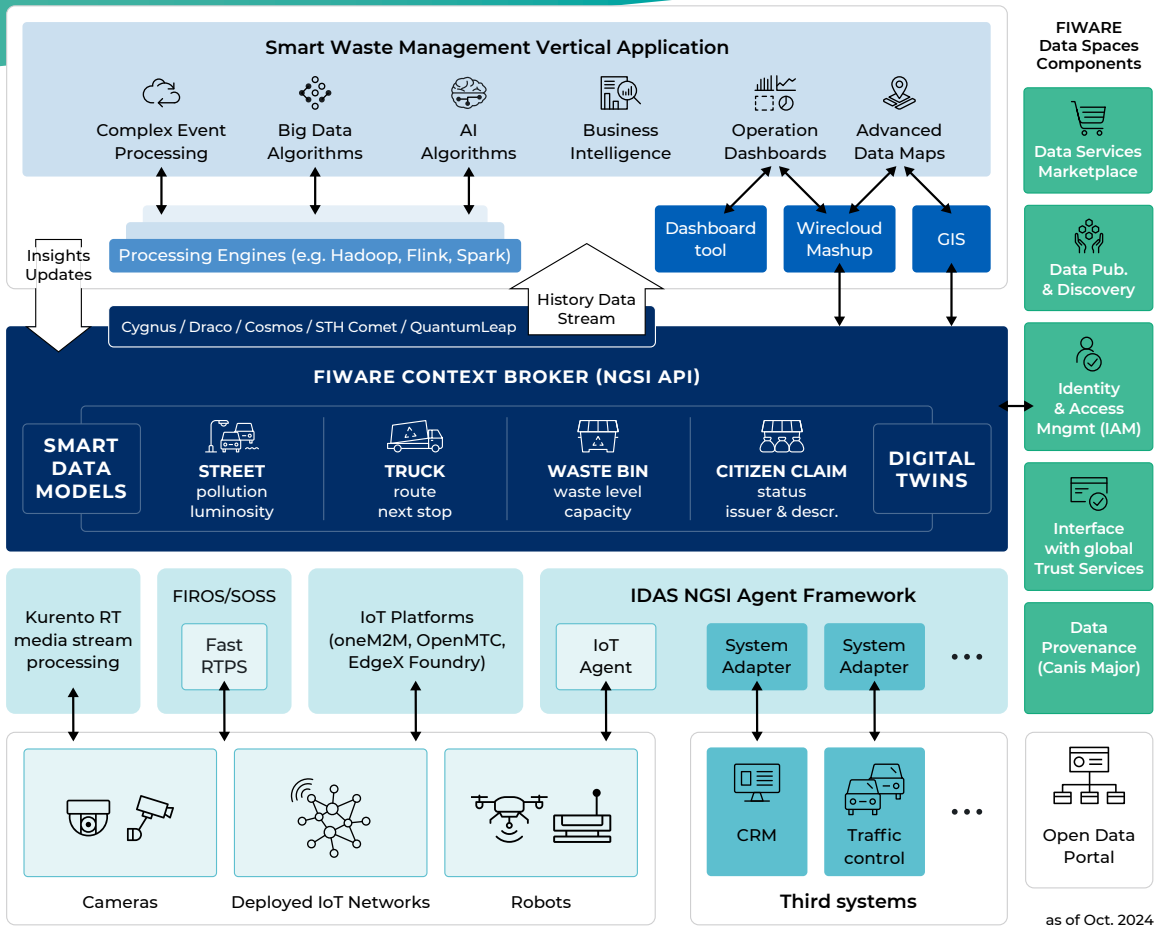
smartdatamodels.org



github.com/smart-data-models

Architecting Smart City Vertical Solutions >>>

By using FIWARE, system integrators have the highest probability of creating sustainable commercial successes, scaling up their Smart City solutions across several cities. The **FIWARE Reference Architecture for Smart City vertical solutions** is based on open standards and thus allows the creation of adaptable, flexible and interoperable applications at minimal cost. Different sources of data consumed or produced by these solutions (e.g. waste management, mobility, air quality and noise) can be integrated with existing systems and provide real-time information and metrics in an unified, integrated and understandable way.



FIWARE is not about taking it all or nothing. Third party platform components can be integrated to build hybrid platforms.

The Reference Architecture of Smart City Vertical solutions 'Powered by FIWARE' offers clear guidelines for System Integrators:

- **Data Management:** the **FIWARE Context Broker** component is at the core of the architecture, keeping a Digital Twin representation of real world entities relevant to the specific problem addressed (e.g. Smart Waste Management). All interactions between applications or platform components and the Context Broker take place using the **NGSI-LD API**.
- **Data Acquisition:** southbound to the Context Broker, **the NGSI IoT Agents**, available as part of the FIWARE IDAS framework, can be used to connect to IoT devices (sensors/actuators), cameras, and other information systems and services. Alternatively, third party IoT platforms can be integrated as well as components facilitating the development of interfaces to connect to robotic systems or video cameras.
- **Data Processing, Analysis and Visualization:** northbound to the Context Broker, a number of FIWARE components are offered to support real-time monitoring and big data analysis or AI / ML processing of the streams of historic data generated as context / Digital Twin information:
 - a. **Advanced Wirecloud Mashup** and **Business Intelligence** components;
 - b. A number of **FIWARE Data Connectors** (Cygnus, Draco Cosmos, STH Comet, QuantumLeap), are available to transfer historic context / Digital Twin information to different types of data sinks, including the most popular **Apache processing engines (Spark, Flink, Hadoop)** and visualization and Business Intelligence tools (e.g. **Grafana, Apache Superset**).

Transversal to the three layers, a number of FIWARE components support **Identity and Access Management** (e.g. Keyrock, API Umbrella, AuthZForce) to ensure that data is accessible to entitled end users and applications only.



System of Systems Approach for a Smart City Reference Architecture



Most municipalities have already invested in vertical solutions (e.g. waste management, traffic management) as well as geoinformation systems or information systems implementing administration processes that now need to be integrated to perform **holistic management of services at the overall city level**.

FIWARE offers the common foundation for the technical realization of the overall reference architecture for the Smart City. Following a '**system of systems**' approach, a shared Digital Twin representation of the city is maintained so that:

- › Each system contributes to enrich part of the Digital Twin representation of the city with data they can provide;
- › Each system accesses data they need from the Digital Twin representation of the city, and thus benefits from information provided by other systems, but decoupled from them;
- › The city implements a city-level Integrated Command and Control Center (ICCC) on top of the shared Digital Twin representation of the city which allows the management and analysis of data in a holistic manner to extract more meaningful insights and for a smarter management of city services.

This approach allows for greater flexibility in meeting new demands and often extends to further use and integration of legacy systems.



With strong technology assets and a close collaboration with members and partners, FIWARE is uniquely positioned to build the Smart City Ecosystem, which can be the end goal in the operationalization of digital and smart strategies of urban development. The white paper "Smart City Ecosystem: Laying the foundations – using decision-making sovereignty" provides an in-depth look at the precise adoption of Digital Twins to meet the requirements of cities based on a system-of-systems approach.

The **FIWARE Reference Architecture for Smart Cities** brings the **FIWARE Context Broker** component as the centerpiece, holding a **Digital Twin representation of the entire city**. The different vertical smart solutions deployed (e.g. Air Quality Monitoring, Smart Traffic Management, Smart Parking, Smart Waste Management) or City information systems (e.g. Citizen Relationship Management system) are connected to the FIWARE Context Broker contributing the information they manage and are accessing the information they need. All interactions between applications or platform components with the Context Broker simply use the **NGSI-LD API**. For those applications and solutions that are not 'Powered by FIWARE' (which translate from whatever API these systems export to NGSI-LD), the creation of NGSI system adapters has proven not to be difficult.

In addition, FIWARE brings a rich suite of complementary components implementing:

- › Interfaces with the Internet of Things (IoT), robots and video cameras;
- › Processes, analysis and visualization of Digital Twin data / context information;
- › Identity and Access management;
- › Data publication and monetization.

Components for the integration of FIWARE Context Broker technology with **Distributed Ledger Technologies** support trustworthy traceability of transactions, which paves the way for the implementation of transparency in city processes.

Smart City Governance Systems (or City Integrated Command and Control Centers) built upon this Context / Digital Twin representation are able to monitor the status of the city and extract more valuable insights to support decision-making thanks to the application of real-time Big Data analysis and AI/ML processing techniques that, leveraging this holistic representation, are able to merge with data coming from multiple sources.

A system of systems approach warrants a number of key properties:

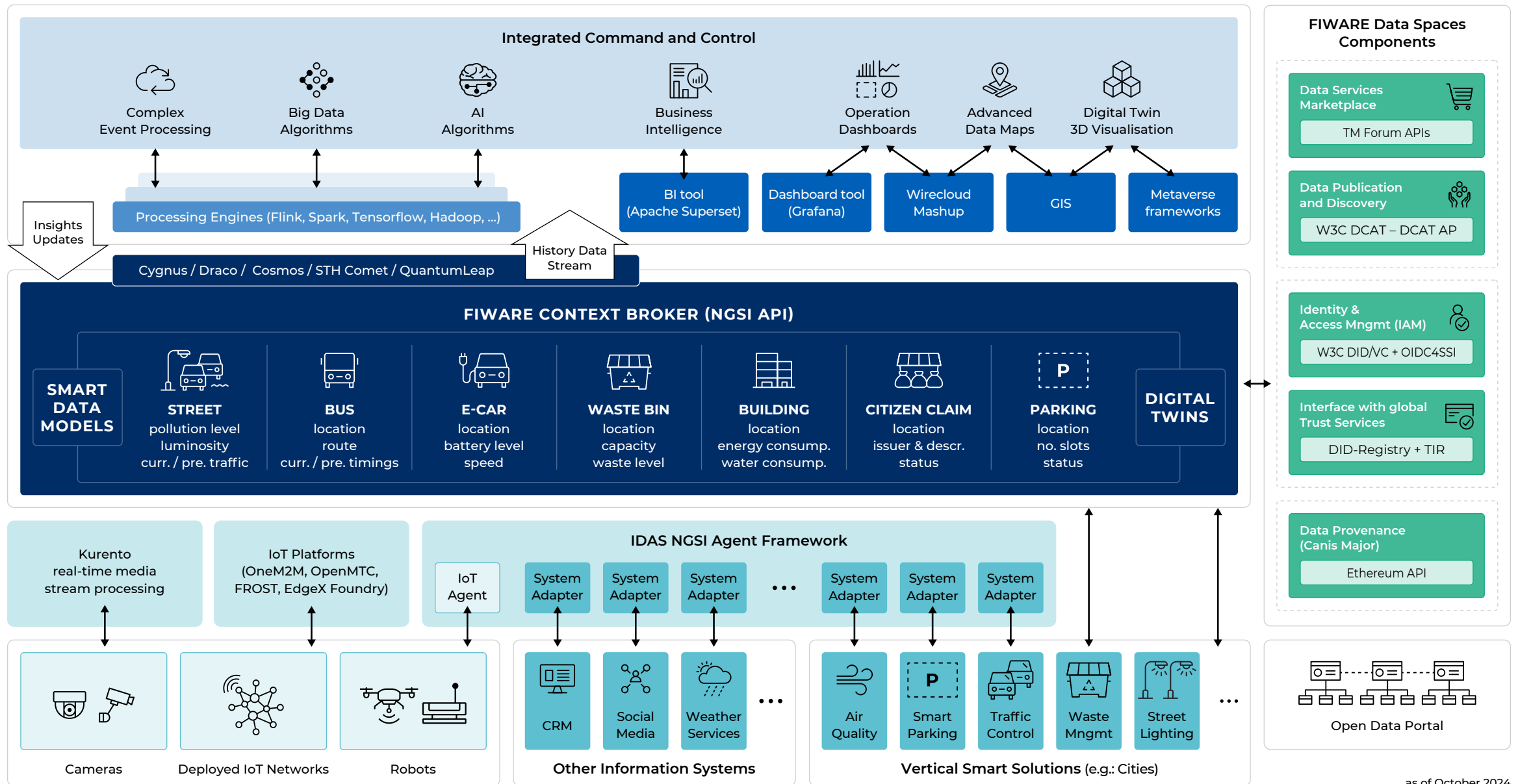
› **Replaceability**, so that systems can be replaced at any time, avoiding vendor lock-in;

› **Extensibility**, meaning new systems can be added easily;

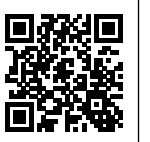
› **Loose coupling**, so that systems can evolve independently;

› **Low intrusiveness**, meaning that legacy systems do not need to change their architectures.

The FIWARE Smart Cities Reference Architecture



Find a complete overview
of FIWARE Components
in the FIWARE Catalog



>>> Cities as Enablers of the Data Economy through data spaces

A new Data Economy is emerging, as technological advancements are transforming supply chains into complex mesh ecosystems. Not only as data producers, but also providing the means for third parties to publish their data in data marketplaces they run, **cities are called to play an increasingly important role in this Data Economy**. They are gradually becoming the platforms for end users and businesses requiring near real-time contextualized data. Based on FIWARE's core capabilities cities become platforms for the publication of the required Context Data combining pieces of information originating from multiple (and new) sources. Due to the rise in data availability and new data-driven insights, more and more data can be exchanged within and among cities and companies. This will spawn a new Data Economy built upon using data to generate value, **ensuring that only owners of the right pieces of information will have the power to drive decisions**.

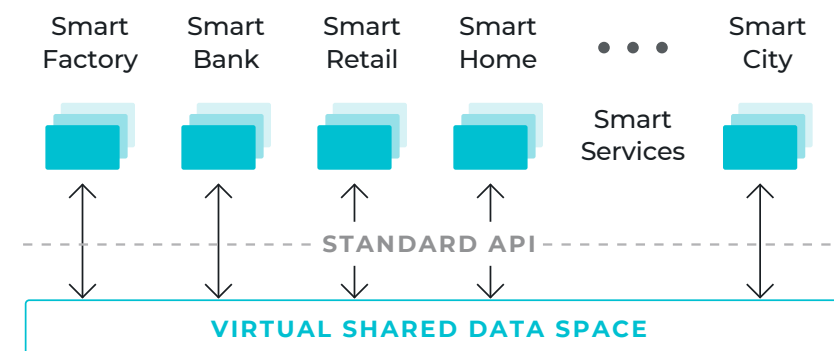
FIWARE brings new economic opportunities to the city, helping solution providers and system integrators to create platform models that **connect consumers and producers**. This enables a federated publication of context data, allowing app builders to find and use data from city and third party sources while preserving Data Sovereignty. User rights acquisition processes and revenue-sharing APIs enable these "consumers and producers" to **buy and sell context / Digital Twin data**, building the basis for the new local Data Economy.

A data space can be defined as a decentralized data ecosystem built around commonly agreed building blocks enabling an effective and trusted sharing of data among participants. **Creation of data spaces will drive the development of the Data Economy and FIWARE brings open standard-based building blocks to make this happen**. Cities connecting to data spaces powered by FIWARE can benefit from the data services offered by third parties and, at the same time, provide data services that will fuel the development of innovative services.

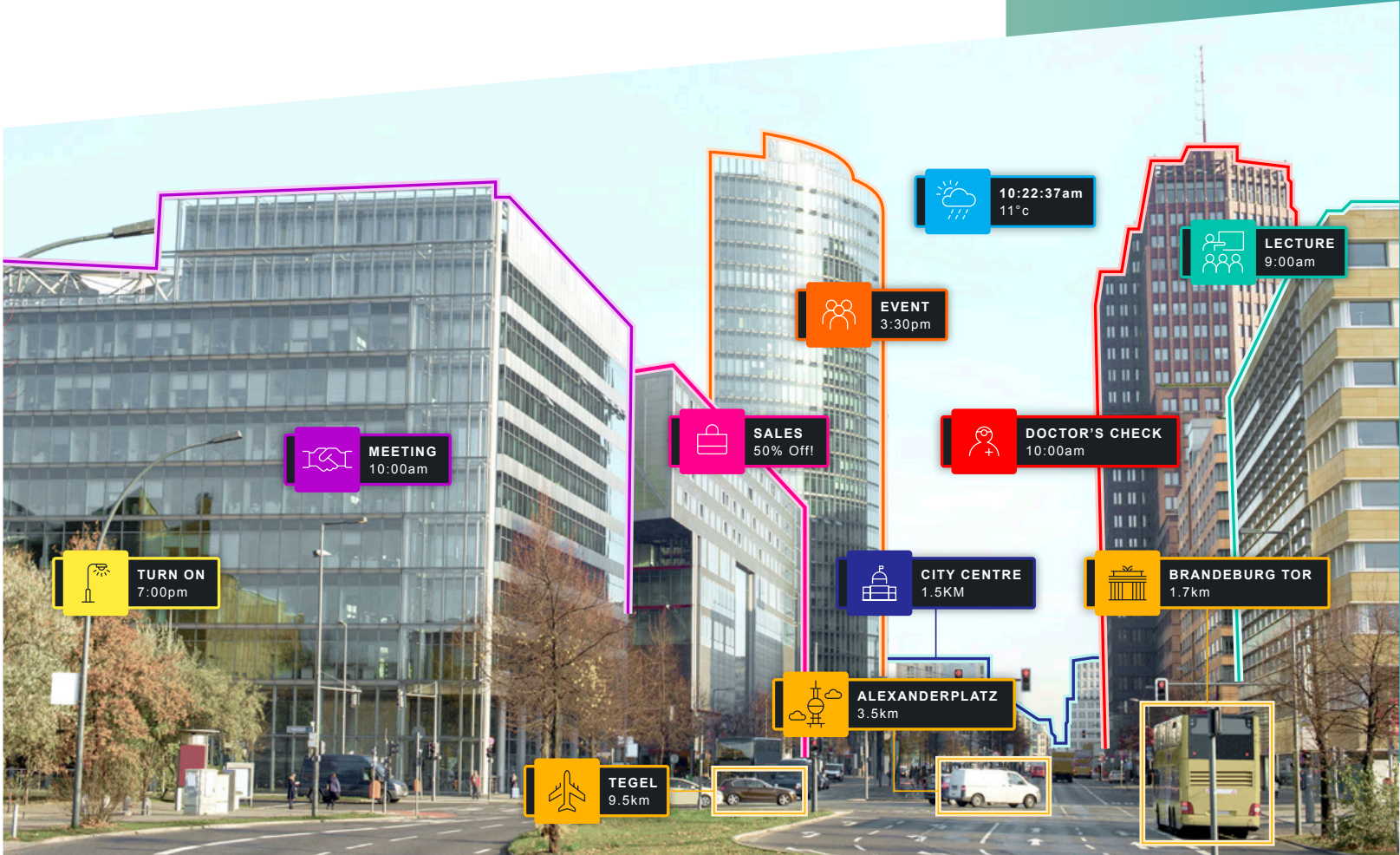
With FIWARE, users in diverse domains can effectively **share and exploit data relevant in other domains thanks to domain-agnostic common APIs, security schemas for data exchange and Smart Data Models**. Furthermore, they can share data under concrete terms and conditions, including pricing or data/usage control policies. This paves the way for the creation of innovative services and business models.

FIWARE brings all the necessary technology Building Blocks for the creation of data spaces ensuring:

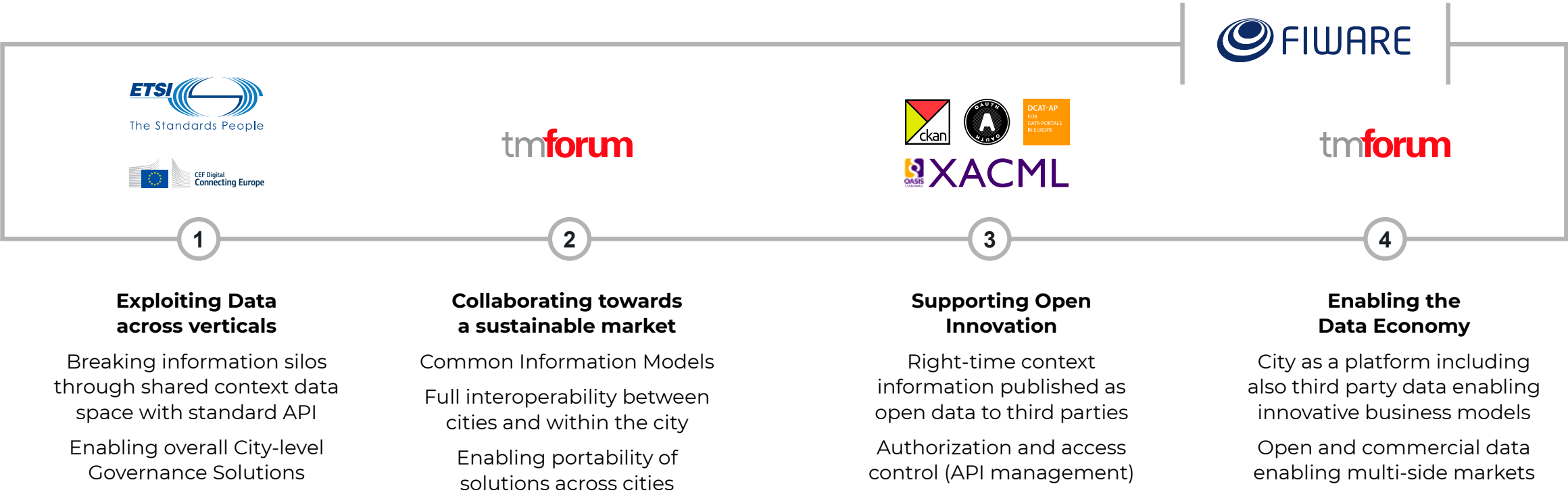
- **Data Interoperability:** supporting efficient data exchange among participants creating a common language based on NGSI-LD as a standard API for the exchange of Digital Twin data, security schemas for data exchange and Smart Data Models;
- **Data Sovereignty and Trust:** empowering participants to exercise sovereignty over data they share through the adoption of common standards for managing the identity of participants, verifying their truthfulness, and enforcing data access and usage control policies;
- **Data Value Creation:** enabling participants to collaborate in the development of multi-sided markets where they can generate value out of data sharing (i.e. creating data value chains).



The Smart Cities Transformation Journey >>>



FIWARE is teaming up with important industry players and global organizations to support Smart Cities in their **digital transformation journey**. Together we can and must scale up faster!



Adoption at Global Scale >>> FIWARE Smart Cities Ecosystem

Reflecting the diversity of the market, FIWARE has been participating in, or leading **strategic collaborations to grow adoption by cities around the globe**. Known for its wide-spanning smart cities ecosystem, FIWARE collaborates and unifies voices of leaders from SMEs to global companies, from academia to accelerators, from standardization organizations to analysts. Important partnerships include:

IUDX (India Urban Data Exchange)

- > This partnership is a major milestone in the globalization of Open Source and standard technologies developed by FIWARE. The collaboration paves the way for a growing and sustainable ecosystem scaling up to nation-wide approaches and to realize uniform and seamless platform strategies. IUDX is an **Open Source software platform, based on the same standards implemented by FIWARE**, that has been facilitating secure and authenticated exchange of data amongst various data platforms onboarding over the following years to more than 100 Indian major cities, with 10 cities already up and running.

IUDX is additionally one of the four global players leading, together with FIWARE, OASC and TM Forum, the definition of common data models for cities under the umbrella of the **Smart Data Models Program**.

OASC (Open and Agile Smart Cities)

- > A non-profit organization that connects more than 150 cities and communities worldwide to learn from each other and exchange digital, data-driven solutions based on Minimal Interoperability Mechanisms (MIMs) with the goal of creating and shaping the nascent global smart city data and services market. OASC adopted the **ETSI NGSI-LD API as a baseline**.

> European Commission (EC)

In 2018, the EC selected the **FIWARE Context Broker Technology as their fifth Connecting Europe Facility (CEF) Building Block** within the Digital CEF program. Since then, the EC officially recommends the FIWARE Context Broker to the public and private sectors, as well as to industrial players within and outside the European Union (EU). Players on their way to adopt this technology for the publication of real-time context data are thus enabled to foster the development of a next generation of products and services, which can be replicated (ported) across member states and interoperate cross-border.

> ETSI (European Telecommunications Standards Institute)

A European Standards Organization created in 1988, acting as a recognized standards body dealing with telecommunications, broadcasting and other electronic communications networks and services. The collaboration led fruitfully to the first version of **ETSI NGSI-LD API specification** in 2018, which was based on the FIWARE NGSIv2 specifications developed by the FIWARE Community. It continues to evolve based on the active contribution of members of the Community. The publication of the NGSI-LD API specifications by ETSI represents a major milestone since cities can refer to an open specification supported by a reputed global standardization body in their Public Procurement processes.

> RECI

In 2022, the Spanish Smart Cities Network (RECI) signed a cooperation agreement with the FIWARE Foundation to collaborate in the definition of general guidelines for the architecture of Smart Cities relying on FIWARE Context Broker technology. With more than 93 city members, RECI is committed to sharing experiences, collaborating on a sustainable management model, and improving quality of life through environmental protection and sustainability.



More global Organizations partnering with FIWARE

TM Forum

An alliance of 850+ global companies working together to break down technology and cultural barriers between digital service providers, technology suppliers, consultancies and systems integrators. Their collaboration with FIWARE started in 2018 with the aim of **supporting the transformation of cities into platforms that bring support to the development of a Data Economy**. Additionally, both organizations collaborate **in the definition of Data Models for Smart Cities under the Smart Data Models Program** serving as the basis for Common Information Models already adopted by cities. Another area of joint forces covers the development of components enabling the evolution of Open Data Portals into Data Marketplaces relying on TM Forum Open APIs.

GSMA (Global System for Mobile Communications)

An industry organization founded in 1982 that represents the interests of mobile network operators worldwide with 750+ mobile operators members and 400+ companies in the broader mobile ecosystem. Through the IoT BigData Ecosystem program to which FIWARE also contributed, mobile operators and their industry partners collaborate in the creation of an ecosystem where development of IoT-enabled Big Data services can be accelerated through the delivery of key APIs and harmonized data sets. Under the umbrella of this program, GSMA published a **Reference Architecture for IoT Big Data Ecosystems recommended to mobile operators that position ETSI NGS-LD as the core API for data management** and development of applications. GSMA also produced **several harmonized data models which have now been integrated into the Smart Data Models Program**.

NIST (National Institute of Standards and Technology)

A physical sciences laboratory and non-regulatory agency of the United States Department of Commerce whose mission is to promote American innovation and industrial competitiveness. With the aim of developing the common architectural principles for Smart Cities, NIST launched in 2016 a global coalition to define an IoT-Enabled Smart City Framework that identified **pivotal points of interoperability**, where emerging alignment on standards could enable the landscape of diverse but interoperable smart city solutions. Within the framework, FIWARE NGS-LD was identified as one strong standard candidate enabling interoperability within a city and portability of solutions across cities.

IDSA (International Data Spaces Association)

Carrying out the mission to create the future of the global, digital economy. Its 170 member companies and institutions, including FIWARE, have created the International Data Spaces Reference Architecture Model (IDS RAM), supporting a sovereign and trusted data exchange, in which all participants can realise the full value of their data. The collaboration started in 2017 focusing on an **Open Source implementation of the IDS Connector technology as an optional element in the FIWARE Catalogue** making systems "Powered by FIWARE" able to participate in data spaces based on the IDS RAM.

BDVA (Big Data Value Association)

An industry-driven international not-for-profit organization with 230+ members all over Europe that focuses on enabling the digital transformation of the economy and society through data and Artificial Intelligence by advancing in areas such as Big Data and AI technologies and services, data platforms and data spaces, industrial AI, data-driven value creation, standardisation, and skills. Collaboration with FIWARE started at the end of 2020 to drive the **adoption of data spaces across Europe and beyond** through a common framework for the exchange of data and trading of Big Data and AI services based on Digital Twins.

Gaia-X

A not-for-profit organization representing the next generation of data infrastructure through an open, transparent and secure digital ecosystem, where data and services can be made available, collated and shared in an environment of trust. **FIWARE is a Day-1 member** of +330 members and contributes with Open Source and open data expertise and use-cases.

In September 2021, BDVA, FIWARE, Gaia-X, IDSA founded the **DSBA (Data Spaces Business Alliance) a milestone- setting alliance to accelerate Business Transformation in the Data Economy and make data spaces** really happen. Together, the four organizations produced the Technical Convergence document, with the objective of achieving interoperability and portability of solutions across data spaces, by harmonizing technology components and other elements.

» » Spotlight – Thriving Smart City projects with FIWARE

FIWARE has been supporting cities for many years to get their Smart City strategies off the ground. More than **400 cities in over 34 countries worldwide** trust in using FIWARE technologies creating a global impact increasing day by day.

ARGENTINA Buenos Aires, Carmen de Areco, Catamarca, La Plata, Posadas

AUSTRALIA Brisbane, Sunshine Coast

AUSTRIA Ganz, Graz, Vienna

BELGIUM Antwerp, Bruges, Brussels, Ghent, Leuven, Mechelen, Roeselare

BRAZIL Angra dos Reis, Brasília, Campo Grande, Curitiba, Florianópolis, Greater São Paulo, Nova Friburgo, Palmas, Recife, Rio Branco, Rio de Janeiro, Salvador, Uberlândia

COLOMBIA Duitama, Manizales, Medellín, Sogamoso

CROATIA Dubrovnik

DENMARK Aarhus, Albertslund

FINLAND Kuopio, Region of Helsinki Uusimaa, Tampere

FRANCE Aix-Marseille-Provence Metropolis, Alpes Provence Verdon, Fort-de-France, French Riviera, La Réunion, Metropolis Nice Côte d'Azur, Noisy-Le-Grand, Paris Airport, Perpignan, Saint-Quentin, Vers-Pont-du-Gard

GERMANY Arnsberg, Bad Berleburg, Bad Hersfeld, Bamberg, Berlin, Darmstadt, Dormagen, Duisburg, Eichenzell, Etteln, Eutin, Fulda, Heidelberg, Herne, Hünfeld, Kaiserslautern, Kiel, Konstanz, Langenfeld, Lemgo, Lübeck, Mainz, Menden, Moers, Mönchengladbach, Monheim am Rhein, Olpe, Paderborn, Potsdam, Schwerte, Soest, South Westphalia Provincial Council, Steinheim, Tegel Airport, Ulm, Wolfsburg, Wuppertal

GREECE Athens, Naxos

INDIA Agartala, Agra, Ahmedabad, Aurangabad, Bareilly, Belagavi, Bengaluru, Bhopal, Bhubaneswar, Bilaspur, Chandigarh, Chennai, Coimbatore, Dahod, Davanagere, Dehradun, Dharamshala, Faridabad, Gandhinagar, Gwalior, Hyderabad, Jaipur, Jammu, Kalyan-Dombivli, Kannur, Kanpur, Karimnagar, Kohima, Lucknow, Nagpur, Namchi, New Town Kolkata, Noida, Pasighat, Pimpri Chinchwad, Prayagraj, Pune, Raipur, Rajkot, Ranchi, Sagar, Satna, Shimla, Srinagar, Surat, Thiruvananthapuram, Thoothukudi, Tumakuru, Vadodara, Varanasi, Visakhapatnam

ITALY Arezzo, Florence, Garda Lake area, Genoa, Livorno, Messina, Milan, Modena, Naples, Perugia, Pisa, Pistoia, Region of Tuscany, Region of Veneto, Rome, Turin, Vicenza, Volterra

JAPAN Chichibu, Fukuoka, Hamamatsu, Higashimurayama, Kakogawa, Kawasaki, Niihama, Odawara, Okinawa Prefecture, Sapporo, Sarabetsu, Sendai, Shizuoka, Takamatsu, Toyama, Tsukuba, Malaysia

MALAYSIA Penang

MÉXICO Aguascalientes, México City

MONACO Monaco

MOROCCO Berkane, Marrakech, Region of Casablanca Settat, Tétouan

NETHERLANDS Amsterdam, Eindhoven, Enschede, Groningen, Hilversum, Region of Utrecht, The Hague

PANAMA Panama City

PERÚ Lima, Miraflores

POLAND Poznan

PORTUGAL Évora, Guimarães, Lisbon, Porto

ROMANIA Braila

SPAIN Alcalá de Henares, Alcoi, Algeciras, Alicante, Almendralejo, Almería, Ávila, Badajoz Provincial Council, Barcelona, Benidorm, Bilbao, Cáceres, Cádiz Provincial Council, Calpe, Calvia, Cartagena, Castellón Provincial Council, Ceutí, Córdoba, Denia, Diputación de Zamora, Dos Hermanas, El Prat de Llobregat, Fuerteventura, Girona, Gran Canaria, Granada, Guadalajara, Huesca, La Manga, La Nucia, La Palma, La Rinconada, Lanzarote, Las Rozas, León Provincial Council, Logroño, Lucena, Lugo, Madrid, Málaga, Mallorca, Molina de Segura, Murcia, Onda, Orense Provincial Council, Osuna, Palencia Provincial Council, Pizarra, Pontevedra Provincial Council, Port of Huelva, Port of Seville, Ports of Balears, Puerto de la Cruz, Region of Andalusia, Region of Castile and León, Region of Castilla la Mancha, Sabadell, Salamanca, San Sebastián, Santander, Santiago de Compostela, Segovia Provincial Council, Soria Provincial Council, Tenerife Island, Toledo, Utrera, Valdepeñas, Valencia, Valladolid, Vallat, Vigo, Vilanova i la Geltrú, Villarreal, Zamora Provincial Council, Zaragoza

SENEGAL Dakar

SWEDEN Åkersberga, Alvesta, Eksjö, Eskilstuna, Eslöv, Gislaved, Gnosjö, Göteborg, Gotland, Habo, Halmstad, Haninge, Härnösand, Helsingborg, Kalmar, Karlstad, Kristianstad, Lessebo, Lund, Malmö, Mölndal, Mullsjö, Nässjö, Norrköping, Örebro, Österåker, Region of Jönköping, Salem, Sävsjö, Solna, Sölvesborg, Southwest Skåne, Stockholm, Sundbyberg, Sundsvall, Täby, Tingsryd, Tyresö, Uppsala, Vaggeryd, Värnamo, Västerås, Vaxholm, Växjö

SWITZERLAND Carouge, Canton of Zürich

UNITED KINGDOM Aberdeen, Great Torrington

URUGUAY Montevideo

USA Aurora, Boston, Independence, Oregon City, Sacramento



We help leading cities from across the globe to get their smart city projects off the ground. The sixth edition of the **#FIWARE4Cities** book, with **160+ cities** and **170+ solutions** from **26 countries**, is a footprint that aims to help cities and communities understand the potential of Open Source technology and open common standards, as well as to help private-sector companies and citizens prepare for the coming wave of change.



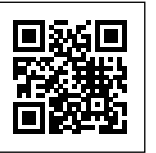
FIWARE4Cities Book

We celebrate and promote thriving Smart Cities with true inspiring **Impact Stories** of innovation and business impact from the FIWARE Community to solve challenges in different domains within a city and beyond.



FIWARE Impact Stories

We offer first-hand access to a wide range of solutions, platforms, technologies, training, coaching, consultancy, integration and support services through the **FIWARE Showcase**. The **Powered by FIWARE** and **FIWARE-ready** labels help entrepreneurs gain visibility and credibility, which are essential to building partnerships and gaining market traction.



FIWARE Showcase

We showcase how life in a Smart City can be easier. The **Smart World by FIWARE** features the potential of Open Source technology for Smart Cities, Smart Mobility, Smart Industry, Smart Energy and Smart AgriFood and how they interact with one another to power up cities.



Smart World by FIWARE

>>> Making cities inclusive, safe, resilient and sustainable

As more and more people move into urban areas, a thorough management of urban growth needs to be in place in order for global issues to be tackled and sustainable development fully achieved. To this end, B20, the private sector's voice of the G20 community, addresses the global challenges and priorities defined by the G20 countries, by building solid consensus amongst business leaders, international organizations and civil society.

B20 Tokyo Summit Joint Recommendations have been towards making Smart Cities the main focus of the G20's efforts to implement Society 5.0 (Japan's smart vision of the future) for the **Sustainable Development Goals (SDGs)**. In line with its commitment from public administrations and private businesses towards the SDGs, FIWARE has been guiding cities and industries to deliver their digital vision, with the active involvement of all the relevant actors.

The FIWARE Community fully endorses the SDGs and is working hard to help cities to deliver them. For instance, the **FIWARE Booklet: Fighting Climate Change** features 30+ game changing solutions based on FIWARE that have become vital to the fight against climate change and are, ultimately, setting common standards for Smart Cities on this topic.

Going forward, the FIWARE Community is also developing a vision on the role of cities and citizens as prosumers of energy (not just consumers but producers) to achieve the goals set by EU Green Deal.



Fighting Climate Change
with FIWARE

>>> Join our ranks!



With more than **650+ global members** in five key domains- Smart Cities, Smart Energy, Smart Industry, Smart Agrifood and Smart Water-FIWARE Foundation is taking the lead in Open Source collaborative ecosystems setting new standards, on a global scale.

Together with its members, FIWARE strives to promote transparency, sustainability, accountability, and economic development laying down the foundation for smart, user-centric digital solutions.

> **FIWARE Foundation Membership.**

Ready to join and shape the cities of the future? As a FIWARE Foundation member, you benefit from the extensive experience and network of our ecosystem made up of small, medium and large global enterprises, startups, end-users, universities, ICT infrastructure providers, and associations.



> **FIWARE Smart Cities Domain Committee.**

FIWARE Members can join our Committee and Boards to bring their vision, experience and knowledge to steer the direction of FIWARE in the specific domain of Smart Cities.



Roberto Di Bernardo
Engineering Ingegneria
Informatica S.p.A.
Co-chair Smart Cities DC



Antonio Jara
Libelium
Co-chair Smart Cities DC

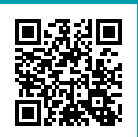


Pierre Golz
City of Herne
Co-chair Smart Cities DC

> **FIWARE iHubs.** A growing network of FIWARE iHubs helps local digital businesses to be more competitive in the growing digital economy, building communities that will, in turn, enable these businesses to thrive not only on a regional but also on a global level. Discover how to get started with FIWARE iHubs.



> **The FIWARE Technical Steering Committee** governs the technical direction of the FIWARE platform and activities of the FIWARE Open Source Community. Members of FIWARE Foundation are welcome to attend Technical Steering Committee meetings and to follow-up first-hand on the progress of the various technical activities. Join us if you want to contribute and impact future developments.





FIWARE, the Open Source
Platform for our Smart
Digital Future

November 2024



fiware.org

